

12/13/17

"Champions keep playing until they get it right."-Billie Jean King

HW: "Solving Higher Degree Polynomials" #8-20 even
Test 2 on Wednesday 12/20

AIM: How do we solve higher degree polynomials?

Warm Up:

1) Solve by completing the square : $3x^2 + 1 = 2x$

$$x^2 - \frac{2}{3}x + \frac{1}{9} = -\frac{1}{3} + \frac{1}{9}$$

$$\begin{array}{r} -2x \quad -2x \\ 3x^2 - 2x + 1 = 0 \end{array}$$

$$\begin{array}{r} -1 \quad -1 \\ 3x^2 - 2x = -1 \end{array}$$

$$\frac{-\frac{2}{3}}{2} = -\frac{1}{3}$$

$$\left(-\frac{1}{3}\right)^2 = \frac{1}{9}$$

Half/square

$$x^2 - \frac{2}{3}x + \frac{1}{9} = -\frac{1}{3} + \frac{1}{9}$$

$$\pm \sqrt{\left(x - \frac{1}{3}\right)^2} = \pm \sqrt{-\frac{2}{9}}$$

$$x - \frac{1}{3} = \pm \sqrt{-\frac{2}{9}}$$

$$\sqrt{-\frac{2}{9}} = \frac{\sqrt{-2}}{\sqrt{9}} = \frac{\sqrt{-2}}{3}$$

$$x = \frac{1}{3} \pm \frac{\sqrt{-2}}{3}$$

$$x = \frac{1}{3} \pm \frac{i\sqrt{2}}{3}$$

On a ***SEPARATE SHEET OF PAPER***, find:

- ⑧ The highest exponent tells us how many possible solutions we will get.

$$p(x) = (x^2 - 9)(\underline{x^2 - 4})$$

$$p(x) = (x+3)(x-3)(x+2)(x-2)$$

b) $x = -3, 3, -2, 2$

Set each factor equal to 0 to find the solutions.

3. $p(x) = (x^2 + 5x - 7)(x + 2)$

a) $p(x) = \frac{(x^2 + 5x - 7)(x + 2)}{x^2 + 5x - 7 = 0 \mid x = -2}$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(1)(-7)}}{2(1)}$$

b) $x = -2, \frac{-5+\sqrt{5}}{2}, \frac{-5-\sqrt{5}}{2}$

$$\frac{-5 \pm \sqrt{53}}{2}$$

5. $p(x) = x^5 - 12x^3 + 32x$

$$a) = x(x^4 - 12x^2 + 32)$$

$$x(x^2 - 4)(x^2 - 8)$$

$$= X(X+2)(X-2)(X^2-8)$$

b)

$x=0$	$x=-2$	$x=2$	$x^2-8=0$ $+8 \quad +8$ <hr/> $x^2=8$
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$$\boxed{X = -2, 0, 2, \pm 2\sqrt{2}} \quad \begin{matrix} X = \pm\sqrt{8} \\ X = \pm 2\sqrt{2} \end{matrix}$$

9. $p(x) = (x^2 + 9)(x + 3)$

15. $p(x) = 16x^4 - 1$

17. $p(x) = x^3 + 6x^2 + 11x + 6$ (hint: -1 is one of the roots)

↑
then $(x+1)$ is a factor

$$\begin{array}{r}
 x^2 + 5x + 6 \\
 x+1 \overline{) x^3 + 6x^2 + 11x + 6} \\
 \underline{-(x^3 + 1x^2)} \\
 5x^2 + 11x + 6 \\
 \underline{-(5x^2 + 5x)} \\
 6x + 6 \\
 \underline{-(6x + 6)} \\
 0
 \end{array}$$

$$p(x) = (x+1)(x^2 + 5x + 6)$$

$$a) = (x+1)(x+3)(x+2)$$

$$b) x = -1, -3, -2$$

19. $p(x) = x^3 - x^2 - 8x + 12$ (hint: -3 is one of the roots)